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(54) Title: PAINT COMPOSITION (57) Abstract <p>Paints and coating compositions, especially those having insulation properties, in particular thermal insulation. The present invention provides for the addition to a hardenable base, of silica, or bagasse or a combination of both, as well as a method of production of the coating composition. Preferably, the hardenable base will form a high build coating when dried or hardened.</p>		

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PAINT COMPOSITION

The present invention relates to coatings and paints and in particular, insulating coatings and paints which provide heat insulation.

5 The paint industry has been, for many years trying to develop a thermo-insulating paint which can satisfactorily prevent heat loss or heat gain across painted surfaces.

 This is evidenced by West German application
10 311,7484 which dealt with the addition of sodium bicarbonate and steric acid to paint; Japanese application 4P57102967 by the addition of Potassium titanate fibres and glass frit; Japanese applications
15 4P58167657 and 4P83164657 by the addition of aluminium flakes, glass wool and polo filler; USSR application 1014812 by the addition of perlite and mineral wool; USSR application No. 286198 by the addition of glass wool and calcium cyanate; and finally USSR 481584 by the addition of perlite and boric acid.

20 Each of these is of somewhat limited value. The major problem which is faced by paint manufacturers and in particular those trying to develop an effective insulating paint, is being able to add sufficient insulating raw materials and at the same time maintain a
25 thin paint film.

 This problem causes increased costs due to thickness of film, as well as extra weight being carried by the coated objects. Further difficulties arise in applying the paint to the articles to be coated.

30 DEFINITIONS

 Throughout the specification and claims, the term "liquid" will be understood to include amorphous, gelatinous, fluid and pourable substances. Further, throughout the specification, the appearance of an
35 asterisk (*) denotes that the substance mentioned is identified by its Trade Mark or registered Trade Mark.

 In the art, the subject of this application, a high build coating is considered to be a coating, which when dried would be of a thickness in the range of 100 microns

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(approx.) up to 5 mm (approx).

It is an object of the present invention to provide a thermal insulating coating, and a method of producing same.

5 According to another aspect of the present invention there is disclosed an insulating coating composition comprising:

- (a) a hardenable liquid base; and
- (b) either silica or bagasse

10 According to a further aspect of the present invention there is disclosed an insulating coating comprising:

- (a) a hardenable liquid base;
- (b) silica; and
- 15 (c) bagasse.

According to another aspect of the present invention there is disclosed a method of producing an insulating coating, said method including the steps of:

- (a) collecting bagasse;
- 20 (b) grinding and/or particulating said bagasse to an average particle size of 0.01 mm to 5 mm; and
- (c) mixing the now particulated bagasse into a paint, coating or like substance.

25 Bagasse is a natural substance and is the term applied to the final crushed fibre remaining after milling of sugar cane. It consists of fibre (cellulose), water and a small quantity of sugar. It is generally used as or made into fuel, feed, and fibre board.

30 Bagasse is the main source of fuel in the production of steam for mill operation. In some countries, bagasse is a raw material used for the manufacture of paper.

35 According to a preferred aspect of the present invention there is disclosed an insulating paint, said paint comprising a paint base which produces when dried, a membrane of a substantially high build coating; and up to 60% by weight of a combination of silica and bagasse.

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Preferably the silica used is a granular type having a hollow centre, whilst the bagasse is preferably dried then ground up to a consistency wherein the average size of particles is approximately 0.01 mm to 5 mm.

5 Good results have been obtained with a silica known as Q-CEL 450* silica microspheres, which is combined with bagasse into a high build membrane paint.

 Q-CEL 450* or Q-CEL 500* are hollow organo silicon modified borosilicate microspheres and as a commercial
10 product are sold as an odorless dry white powder. The microspheres are readily wetted out by organic fluids but resist wetting by water. They typically have a bulk density of 0.105 gm/cm³; a typical effective density/
15 liquid displacement of 0.15 to 0.5 gm/cm³ with a mean particle size (diameter) of 65 to 70 microns ranging between 10 to 200 microns.

 Other forms of silica can be utilised, such as hollow organo silicon modified borosilicate microspheres of different dimensions, solid glass microspheres, which
20 are manufactured from A-glass, which are commercially available in graded sizes from 5 to 5000 microns; ceramic, polymeric and mineral microspheres. Further, combinations of these different "silicas" can be utilised.

 The natural substance bagasse can be replaced by an
25 artificially manufactured substance whose chemical composition is any one of the following, or a combination of any one of the following:

- A) Dry cellulose: approx 40% by weight
 Pentosan: approx 22% by weight
30 Lignin 19% by weight
 Ash: approx 20% by weight
 Impurities (incl: water, raw sugar and dirt) approx 17% by weight
B) Holo cellulose: approx 60% by weight; and
35 C) Moisture content: approx 49%

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Insoluble solids: approx 48.7%

Soluble solids: approx 2.3%

Each of A, B and C a the chemical breakdown of bagasse and percentages mentioned can be varied to produce differing properties. In the case of natural bagasse, the chemical breakdown and properties may alter depending upon methods used to grow the sugar cane and the climate and location where the sugar cane is farmed.

The hardenable liquid base can be a paint or paint base such as an acrylic membrane paint, a copolymer resin, an alkyd resin and any other suitable coating, or liquid base, which will harden.

Examples of the present invention will now be described with reference to experimental results and the figures of the drawings in which:

Fig. 1 illustrates a test rig;

Fig. 2 is a graphical representation of the results of tests conducted over a 6 hour period on a dried film of a paint to the present invention; and

Fig. 3 is a graphical representation of the results of tests conducted over a 48 hour period on the same film of that whose results are shown in Fig. 2.

INSULATING PAINT EXAMPLE 1

A sample of insulating paint was produced from a paint base, this paint being of an acrylic membrane type as is commonly known in the industry. To this paint base was added 10% by weight of specially treated bagasse. This special treatment consisted of a ground down or particulate bagasse of approximately 0.01 mm to 0.5 mm.

To this was further added 5% by weight of Q-CEL 450* spherical silica.

These were mixed by means of gentle paddle stirring.

The paint mixture was then applied by roller to produce:

- (a) a membrane of dried paint; and
- (b) a piece of galvanised sheet metal coated with the paint.

TESTING

A heat barrier membrane test was devised to measure

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the insertion loss of membrane, at average and normal temperature, in conditions simulating actual use on roofs, and situations generally where ambient temperatures exists on reverse surface of membranes and a higher temperature exists on the obverse surface.

TEST APPARATUS - (See Fig. 1)

The apparatus consisted of 2 cylindrical chambers 1 and 2 fabricated from galvanised sheet steel of 1 mm thickness.

Each chamber 1 and 2 has two concentric cylinders 3 and 4 of height 60 cm. Inner cylinder 3 has a 30 cm diameter and outer cylinder 4 has a 40 cm diameter with space 5 between filled with insulation 6 and end spaces sealed with galvanised sheet.

Chambers 1 and 2 have galvanised sheet flanges 7 at each end, being some 60 cm square with 30 cm hole 8 in centre and 3 heat sensitive probes 9 sited 120° apart, round the periphery, spaced 5 cm from one end.

Chambers 1 and 2 are stacked vertically. Lower chamber 2 is heated as required and upper chamber 1 is at ambient temperature of laboratory area, being open at the top.

The design of chambers 1 and 2 and their volume is an optimum compromise between 2 conflicting factors:

1. It should be large enough to permit valid testing (a sample of membrane say 600-1000 square cm, is a reasonable size) and avoid the difficulties inherent in arranging a very small heat supply with adequate control; and
2. It should be small enough not to require excessive heat input, with the control and insulation problems inherent in containing large amounts of heat, and particularly, circulating air currents minimized so that the temperature measured on both membrane (15) surfaces is sensibly the temperature over the total area.

A unit assembly of radiator 10 with infrared lamp 11 and incandescent lamp 12 as the heat source in the bottom of lower chamber 2 and having an electric current

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supply at 50 hertz, variable, in steps of 1 volt, which is read on a meter connected across the unit input.

Voltage variation is by WF8(G.R.) Variac* rated at 10 amps, with 60 volts connected across its 0-280V winding, so providing an effective 'band-spread' of more than 4 times that of the Variac scale.

During programming of apparatus, the voltage was calibrated against temperature (after it had stabilised) and a scale compiled, so in running the test series, repeat results were reliable and predictable. Tests were repeated 10 times.

The 3 Type G probes sited 120° apart in top end of bottom chamber 2 and bottom end of top chamber, were connected to a Zeatron GPE* remote reading electronic thermometer and thus 3 readings were obtained in each chamber 1 and 2.

Probes 9 were 5 cm from flange 7 in each chamber 1 and 2 because:

1. Heat rose in bottom chamber 2 so the temperature was measured 5 cm down from the top was sensibly that over the membrane lower surface 15b, circa 40 cm from heat source, thus simulating commercial and domestic application of membrane 15 in actual use; and
2. Top chamber 1 at ambient temperature has probes 5 cm from membrane upper surface 15a so any heat passing membrane will rise and probes will indicate this.

METHOD

In this test rig the lower surface 15b is the obverse surface whilst the upper surface 15a is the reverse surface. To some extent these test conditions were harsher than actual use conditions as the obverse surface is usually upwardly facing and thereby allows for more cooling and transfer of heat by convection.

Sample membrane 15 was clamped between flanged ends 7 of the chambers 1 and 2 and through bolted to prevent air leakage.

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Heat was supplied to bottom chamber 1 and temperature recorded as the average between 3 probes, which differed slightly due to unavoidable air current. Chamber 2 therefore proved, close to ideal. Probes in top chamber 1 showed no variation, as predicted.

RESULTS

The insulating paint of example 1 is a heat barrier, providing almost 99% insertion loss when tested under conditions simulating actual use on roofs and similar use.

No variation of any significance was observed between:

1. Membrane alone; and
2. Membrane on galvanised sheet.

The measurements recorded in these tests for membrane 15 alone are graphically represented in Figs. 2 and 3.

In Fig. 2 the lefthand margin represents degrees celcius whilst the the bottom margin represents hours from the start of the test. The upper graph represents the temperature of the membrane whilst the lower graph represents the ambient temperature.

The heat source remained stable at 40°C, one hour after the start of the test run. The 3 probes read to within 1°C of each other.

In Fig. 3 the lefthand margin represents degrees Celcius whilst the bottom margin represents the time of day with ambient temperature being varied according to natural conditions over a 48 hour period. The figures at the bottom margin represent the time on a 24 hour clock.

The upper graph represents the temperature of the membrane whilst the lower graph represents ambient temperature.

The tested membrane had one smooth and one rough surface. As the membrane tested was not of continuous cross-section, (in fact varying from approx 0.2 mm to approx 0.6 mm in some places), this exaggerated the reading for the heat gain of the membrane.

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THERMALLY INSULATING COMPARATIVE EXAMPLE (CONTROL)

The tests conducted on membrane and membrane on galvanised sheet were compared to a "Batt", which is a type of fibreglass insulation used generally by the building industry to insulate roofs and other building elements.

The batt tested was a rated R2.5 (see Standards Association of Australia A.S. 2627 Part 1, 1983).

When tested under the same conditions as the membrane and membrane on galvanised sheet, the performance of the batt was not significantly different from that of the membranes.

(CONTROL) NON INSULATING PAINT EXAMPLE

The paint base used to manufacture the insulating paint of example 1 was taken separately and a film of same was produced. This film was placed in the test apparatus and the obverse surface was subjected to a temperature of 40°C. The initial temperature measurement on the reverse side was measured at 32.3°C at an ambient temperature of 21.1°C and was measured one hour after the 40°C temperature had stabilised in the heat source chamber.

Subsequent measurements recorded an increase in the reverse side temperatures such that with the effluxion of time, both sides were within 2°C of each other. That is the obverse was 40°C whilst the reverse side was 38°C.

SHEET METAL COMPARATIVE EXAMPLE

A piece of sheet metal, such as that coated with the insulating paint of example 1, was tested in an uncoated condition.

The galvanised sheet metal was placed in the test apparatus and the obverse side was subjected to a temperature of 40°C. The initial temperature measurement on the reverse side was measured at 30.6°C at an ambient temperature of 21.1°C, and was measured one hour after

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the 40°C temperature had stabilised in the heat source chamber.

Subsequent measurements recorded an increase in the reverse side temperature, such that with the effluxion of time, both sides were within 2°C of each other. That is the obverse side was 40°C whilst the reverse side was 38°C.

Further test have been conducted in open air conditions at experimental test sites in Australia.

10

ALLUNGA TEST RESULTS

Tests were conducted in far north Queensland, Australia at Allunga, (Lat°19 15'S Long 146 46'E) where temperatures were measured between 11.45 a.m. and 12.45 p.m. in degrees Celcius, on days of little or no cloud.

The galvanised steel sheds (two were constructed) were identical and erected in parallel position approximately 3 metres apart. Temperature probes were fixed in identical positions in each shed at a position 1 cm below the centre, inside, and doors were closed at all times.

20

Results were as follows:

	<u>Date</u>	<u>Paint Insulated</u>	<u>Unprotected Shed</u>
		<u>Shed</u> °C	°C
25	<u>October</u>		
	28	39	44
	29	37	40
	30	38	45
	31	36	41
30	<u>November</u>		
	8	38	42
	11	40	49
	13	37	43
	15	39	46
35	18	41	49
	25	40	51
	28	43	53
40	<u>December</u>		
	2	40	48
	4	39	45
	8	43	42
	9	42	50
	10	43	50

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	<u>Date</u>		<u>Paint Insulated</u>
	<u>Unprotected Shed</u>		
	<u>Shed</u>	<u>Shed</u>	OC
		OC	
5	<u>December - Cont.</u>		
	12	40	47
	14	43	50

On the days of December 8th, 9th, 10th, 12th and 14th, the outside temperature in the sun was recorded as being

10 33°, 34°, 35°, 34° and 33° C respectively.

SYDNEY TEST RESULTS

Further tests were run in Sydney, Australia (Lat 33° 55'S, Long 151°10'E) over a 3 month period. When building the shed, foundations were laid using ordinary kiln fired building bricks, and a platform laid on said foundations. Both sheds were exposed to the same temperatures in each 24 hour period.

The results were as follows:

	<u>Date</u>	<u>Weather Conditions</u>	<u>Maximum Temperatures Recorded</u>	
			<u>Paint Insulated</u>	<u>Unprotected</u>
			<u>Shed</u>	<u>Shed</u>
			OC	OC
	<u>September</u>			
25	5	Clear, S.W. winds	20	26
	7	Clear, W. winds	18	26
	9	Cloudy, W. winds	23	29
	11	Calm, cloudy	21	27
	13	Calm, Cloudy	21	28
30	15	Calm, sun	22	29
	17	Calm, cloudy	21	28
	19	Calm, cloudy, rain	20	25
	21	Sun, fine, calm	18	25
	23	Sun, fine, calm	24	29
35	25	Cloud	26	32
	27	S. winds	19	25
	29	Calm, cloud	22	29
	<u>October</u>			
	1	Calm, clear, sun	25	32
40	3	Calm, sun	26	32
	5	Wind - change to south	28	35
	7	S.S.W. winds, cloud	24	29
	9	Calm, cloud, showers	24	30
	11	Clear, change to S. winds	27	34
		p.m.		
45	13	2/11/05, EAST Version: 2.0.1.4	17	17

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		<u>Maximum Temperatures</u>	
		<u>Recorded</u>	
<u>Date</u>	<u>Weather Conditions</u>	<u>Paint Insulated</u>	<u>Unprotected</u>
		<u>Shed</u>	<u>Shed</u>
		OC	OC
5			
	<u>October - Cont.</u>		
	15 Light S. winds, cloud, clearing	21	26
	17 Sun, clearing	23	29
10	19 Rain a.m., cloud	21	25
	21 Clear, sun, calm	22	28
	23 Cloud, showers, clearing	26	31
	28 Clear, sun	22	27
	29 Clear, sun	20	26
15	31 Clear, sun	23	29
	<u>November</u>		
	1 Clear, sun, N.E. winds	24	30
	3 Clear, sun, N.E. winds	27	33
	5 Cloud	28	35
20	7 Cloud, sun, calm, humid	27	34
	9 Clear, sun, calm	28	34
	11 Cloud, S.E. winds, showers	26	32
	13 Cloud, N.W. winds - slight	24	29
	15 Cloud, S.W. winds, rain	26	32
25	17 Cloud, S.E. winds, showers	28	33
	19 Clear, calm	21	28
	21 Cloud, S.E. winds - fresh	24	28
	23 Cloud, S.E. winds, fresh	25	31
	25 Cloud, S.E. winds - slight	21	30
30	27 Cloud, S.E. winds, showers	26	33
	29 Cloud, S.E. winds, showers	24	30
	<u>December</u>		
	1 Cloud, S.E. winds, showers	24	31
	3 Calm, rain	24	29
35	5 Calm, light cloud	26	33

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FURTHER INSULATING PAINT EXAMPLESExample 2: STYRENE ACRYLIC HARDENABLE BASE.HARDENABLE BASE:

5	BASF 290D Acrylic*	322	Kgs
	Dispex N40*	3.4	Kgs
	Beveloid 60*	2.3	Kgs
	Corflex 880*	4.6	Kgs
	Basf S.300 Acrylic*	32.0	Kgs
10	Titanium Dioxide	60.0	Kgs
	Calcium Carbonate	100.0	Kgs
	Water	52.0	Litres
	M.D. 13 (Mercury)*	1.75	Kgs
	Corsal EEA*	7.5	Kgs
15	White Spirits	11.5	Litres
	Ammonia	2.75	Litres

BAGASSE: 90 Kgs.

This amount represents approx 12.5% by weight of the total composition.

SILICA: Hollow organo silicon modified borosilicate microspheres: 30 Kgs. This amount represents approx 4.2% by weight of the total composition.

Example 3: ACRYLIC HARDENABLE BASEHARDENABLE BASE:

25	Ethylene Glycol	7.41	Kgs
	Water	42.0	Kgs
	Natrasol 250 HR*	.86	Kgs
	Orotan 731 25%*	2.39	Kgs
	Triton G.F.10*	.20	Kgs
30	M.D. 13 (Mercury)*	.5	Kgs
	Texanol*	4.4	Kgs
	Titanium Dioxide	15.0	Kgs
	Calcium Carbonate	40.0	Kgs
	Talc	17.0	Kgs
35	Silica 140 Mesh	17.35	Kgs
	Primal AC 388*	115.0	Kgs
	Silica 140 Mesh	8.67	Kgs
	Beveloid 60*	.400	Kgs
	E.T.P	3.0	Kgs
	Water	To Viscosity	

40 BAGASSE: 42.0 Kgs. This amount represents approx 12.7% by weight of total composition excluding water added for viscosity.

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SILICA: Hollow organo silicon modified borosilicate:
14.0 Kgs. This amount represents approx 4.2%
by weight of total composition excluding water
added for viscosity.

5 Example 4: ALKYD RESIN BASE

HARDENABLE BASE:

	White Spirits	46	Kgs
	Alkyd Resin M17	92	Kgs
	Alkyd Resin M57	92	Kgs
10	Cereclor 48*	1	Kgs
	Polybutane 100*	6	Kgs
	Titanium Dioxide	40	Kgs
	Zinc Oxide	4	Kgs
	Mica	25	Kgs
15	Calcium Carbonate	50	Kgs
	M.D. 13 (Mercury)*	0.3	Kgs
	Crodaclay*	4	Kgs
	D.A.A.	1	Litre

20 BAGASSE: 36 Kgs. This amount represents approx 8.8% by
weight of the total composition.

SILICA: Hollow organo silicon modified borosilicate
microspheres: 12 Kgs. This amount represents
approx 2.9% by weight of the total composition.

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Example 5: COPOLYMER HARDENABLE BASE COMPRISED OF
PLIOLITE RESINHARDENABLE BASE:

5	Titanium Dioxide	20.7	Kgs
	Calcium Carbonate Course	8.5	Kgs
	Course Extender 1	17.1	Kgs
	Mica	7.0	Kgs
	Diamtomaceous Silica	6.5	Kgs
10	Wetting Agent	0.115	Kgs
	Pliolite AC 80*	6.44	Kgs
	Pliolite AC 4*	1.61	Kgs
	Chlorinated Paraffin 65	6.67	Kgs
	Mineral Spirits	27.6	Kgs
	Polar Solvent	3.795	Kgs

15 BAGASSE: 15 Kgs. This amount represents 11.8% by weight of the total composition.

SILICA: Hollow organo silicon modified borosilicate microspheres: 6 Kgs. This amount represents 4.7% by weight of the total composition.

20 Example 6: COPOLYMER HARDENABLE BASEHARDENABLE BASE:

25	Titanium Dioxide	10.0	Kgs
	Calcium Carbonate	9.5	Kgs
	Course Extender 1	9.5	Kgs
	Course Extender 2	21.2	Kgs
	Course Extender 3	9.5	Kgs
30	Course Extender 4	1.4	Kgs
	Wetting Agent	0.045	Kgs
	Pliotite A.C.4*	7.13	Kgs
	Chlorinated Paraffin 50	4.14	Kgs
	Baggase	10.0	Kgs
	Mineral Spirits	22.77	
	Polar Solvent	9.54	

35 BAGASSE: 10 Kgs. This amount represents approx 8.4% by weight of the total composition.

SILICA: Hollow organo silicon modified borosilicate microspheres: 5 Kgs. This amount represents approx 4.2% by weight of the total composition.

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Example 7: COPOLYMER HARDENABLE BASEHARDENABLE BASE:

	Yellow Iron Oxide	2.9	Kgs
	Titanium Dioxide	2.9	Kgs
5	Course Extender 1	63.0	Kgs
	Course Extender 2	8.6	Kgs
	Wetting Agent	0.6	Kgs
	Pliolite A.C.4*	2.76	Kgs
	Chlorinated Paraffin 70	0.345	Kgs
10	Chlorinated Paraffin 50	2.7	Kgs
	Mineral Spirits	15.0	Kgs
	Polar Solvent	4.3	Kgs

BAGASSE: 15 Kgs. This amount represents approx 12.2% by weight of the total composition.

15 SILICA: A Hollow organo silicon modified borosilicate microspheres: 5 Kgs. This amount represents approx 4.1% by weight of the total composition.

Example 8: COPOLYMER HARDENABLE BASEHARDENABLE BASE:

20	Pliolite A.C.4*	17.25	Kgs
	Non Yellowing Plasticizer	1.75	Kgs
	Mineral Spirits	66.3	Kgs
	Polar Solvent	28.75	Kgs
25	Cleaning Agent	6.46	Kgs
	Aggregate 1.8-2 mm	150-200	gm
	Aggregate 3-4mm	150-200	gm

BAGASSE: 15 Kgs. This amount represents 10.7% by weight of the total composition.

30 SILICA: Hollow organo silican modified borosilicate microspheres: 5 Kgs.
This amount represents 3.5% by weight of the total composition.

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Example 9: STYRENE ACRYLIC HARDENABLE BASE.HARDENABLE BASE:

5	BASF 290D Acrylic*	322	Kgs
	Dispex N40*	3.4	Kgs
	Beveloid 60*	2.3	Kgs
	Corflex 880*	4.6	Kgs
	Basf S.300 Acrylic*	32.0	Kgs
10	Titanium Dioxide	20.0	Kgs
	Water	52.0	Litres
	M.D. 13 (Mercury)*	1.75	Kgs
	Corsal EEA*	7.5	Kgs
	White Spirits	11.5	Litres
	Ammonia	2.75	Litres

BAGASSE: 195 Kgs.

15 This amount represents approx 27.1% by weight of the total composition.

SILICA: Hollow organo silicon modified borosilicate microspheres: 65 Kgs. This amount represents approx 9.0% by weight of the total composition.

20 Example 10: ACRYLIC HARDENABLE BASEHARDENABLE BASE:

25	Ethylene Glycol	7.41	Kgs
	Water	42.0	Kgs
	Natrasol 250 HR*	.86	Kgs
	Orotan 731 25%*	2.39	Kgs
	Triton G.F.10*	.20	Kgs
30	M.D. 13 (Mercury)*	.5	Kgs
	Texanol*	4.4	Kgs
	Titanium Dioxide	5.0	Kgs
	Primal AC 388*	115.0	Kgs
	Beveloid 60*	.400	Kgs
	E.T.P	3.0	Kgs
	Water	To Viscosity	

45 BAGASSE: 112 Kgs. This amount represents approx 33.9% by weight of total composition excluding water added for viscosity.

50 SILICA: Hollow organo silicon modified borosilicate: 37 Kgs. This amount represents approx 11.2% by weight of total composition excluding water added for viscosity.

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Example 11: ALKYD RESIN BASEHARDENABLE BASE:

	White Spirits	46	Kgs
	Alkyd Resin M17	92	Kgs
5	Alkyd Resin M57	92	Kgs
	Cereclor 48*	1	Kgs
	Polybutane 100*	6	Kgs
	Zinc Oxide	4	Kgs
	M.D. 13 (Mercury)*	0.3	Kgs
10	Crodaclay*	4	Kgs
	D.A.A.	1	Litre

BAGASSE: 153 Kgs. This amount represents approx 34.8% by weight of the total composition.

SILICA: Hollow organo silican modified borosilicate microspheres: 40 Kgs. This amount represents approx 9.1% by weight of the total composition.

Example 12: GELCOAT BASEGELATINOUS HARDENABLE BASE

	White Spirits	51	Kgs
20	Alkyd Resin M57	186	Kgs
	Polybutane 100	6	Kgs
	Zinc Oxide	6	Kgs
	M.D. 13 (Mercury)*	0.3	Kgs
	Crodaclay	2	Kgs
25	D.A.A.	1.5	Kgs
	White Spirits	to viscosity	

BAGASSE 190 Kgs. This amount represents approx 39% by weight of the total composition excluding white spirits added to viscosity.

30 SILICA: Hollow organo silicon modified borosilicate microspheres: 45 Kgs.
This amount represents approx 9.3% by weight of the total composition.

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Example 13: STYRENE ACRYLIC HARDENABLE BASE.HARDENABLE BASE:

	BASF 290D Acrylic*	322	Kgs
	Dispex N40*	3.4	Kgs
5	Beveloid 60*	2.3	Kgs
	Corflex 880*	4.6	Kgs
	Basf S.300 Acrylic*	32.0	Kgs
	Titanium Dioxide	60.0	Kgs
	Calcium Carbonate	100.0	Kgs
10	Water	52.0	Litres
	M.D. 13 (Mercury)*	1.75	Kgs
	Corsal EEA*	7.5	Kgs
	White Spirits	11.5	Litres
	Ammonia	2.75	Litres
15	<u>SILICA:</u> Hollow organo silicon modified borosilicate microspheres: 80 Kgs. This amount represents approx 11.8% by weight of the total composition.		

Example 14: ACRYLIC HARDENABLE BASEHARDENABLE BASE:

20	Ethylene Glycol	7.41	Kgs
	Water	42.0	Kgs
	Natrasol 250 HR*	.86	Kgs
	Orotan 731 25%*	2.39	Kgs
	Triton G.F.10*	.20	Kgs
25	M.D. 13 (Mercury)*	.5	Kgs
	Texanol*	4.4	Kgs
	Titanium Dioxide	15.0	Kgs
	Talc	17.0	Kgs
	Silica 140 Mesh	17.35	Kgs
30	Primal AC 388*	115.0	Kgs
	Silica 140 Mesh	8.67	Kgs
	Beveloid 60*	.400	Kgs
	E.T.P	3.0	Kgs
	Water	To Viscosity	
35	<u>BAGASSE:</u> 195 Kgs. This amount represents approx 45.4% by weight of total composition excluding water added for viscosity.		

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5 All examples of insulating paints mentioned above (Examples 1 to 14) can be varied and modified to suit particular applications, conditions and purposes. The formulas and compositions may require pigmentation, thereby possibly changing the % by weight of bagasse and silica.

The particular brand of silica (hollow organo silicon modified borosilicate microspheres) utilised is Q-CEL*.

10 Throughout the specification the appearance of an asterisk (*) denotes that the substance mentioned is identified by its Trade Mark or registered Trade Mark.

PRODUCTION OF INSULATING COATING

15 When producing a paint or coating in accordance with the present invention the hardenable liquid base mixture is manufactured separately. To this mixture particulated bagasse is added, being of an average particle size of 0.01 mm to 5 mm, and most preferably 0.01 mm to 0.5 mm.

20 To produce bagasse of the preferred sizes, the raw material is ground or particulated by any means available.

25 Once the bagasse and the hardenable liquid base have been suitably mixed, the silica is then added. If the silica utilised is hollow organo silicon modified borosilicate microspheres, then it must be the last component added, as the hollow nature of the spheres is such that the sphere can be broken.

30 Where an insulation coating is manufactured from a liquid hardenable base and silica alone, then silica can make upto 50% by weight of the total composition.

40 Where an insulating coating is manufactured from a liquid hardenable base and bagasse alone, then bagasse can make upto 50% by weight of the total composition.

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THE CLAIMS:

1. An insulating coating composition comprising:
 - (a) a hardenable liquid base; and
 - (b) either silica or bagasse.
2. An insulating coating composition as claimed in claim 1, wherein said composition includes both silica and bagasse.
3. An insulating coating composition as claimed in claim 1 or 2 wherein the liquid base when hardened forms a high build coating membrane.
4. An insulating coating composition as claimed in claims 2 or 3, wherein up to 60% by weight of the coating composition is a combination of silica and bagasse.
5. An insulating coating composition as claimed in any one of the preceding claims wherein said bagasse comprises up to 50% by weight of the total composition.
6. An insulating coating as claimed in any one of the preceding claims wherein said silica comprises up to 50% by weight of the total composition.
7. An insulating coating as claimed in any one of the preceding claims wherein the average particulate size of said bagasse is in the range of 0.01 to 5 mm.
8. An insulating coating composition as claimed in any one of the preceding claims, wherein the average particulate size of said bagasse is in the range of 0.01 to 0.5 mm.
9. An insulating coating as claimed in any one of the preceding claims wherein said silica is made up any one of the following or a combination of any of the following:
 - (a) hollow organo silicon modified borosilicate;
 - (b) solid glass microspheres;
 - (c) ceramic microspheres;
 - (d) polymeric microspheres;
 - (e) mineral microspheres.
10. An insulating coating as claimed in any one of the preceding claims wherein when said silica contains hollow organo silicon modified borosilicate microspheres, it is the last component added to the composition.

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11. An insulating coating as claimed in any one of the preceding claims wherein bagasse (the natural substance) is replaced by an artificially produced equivalent.

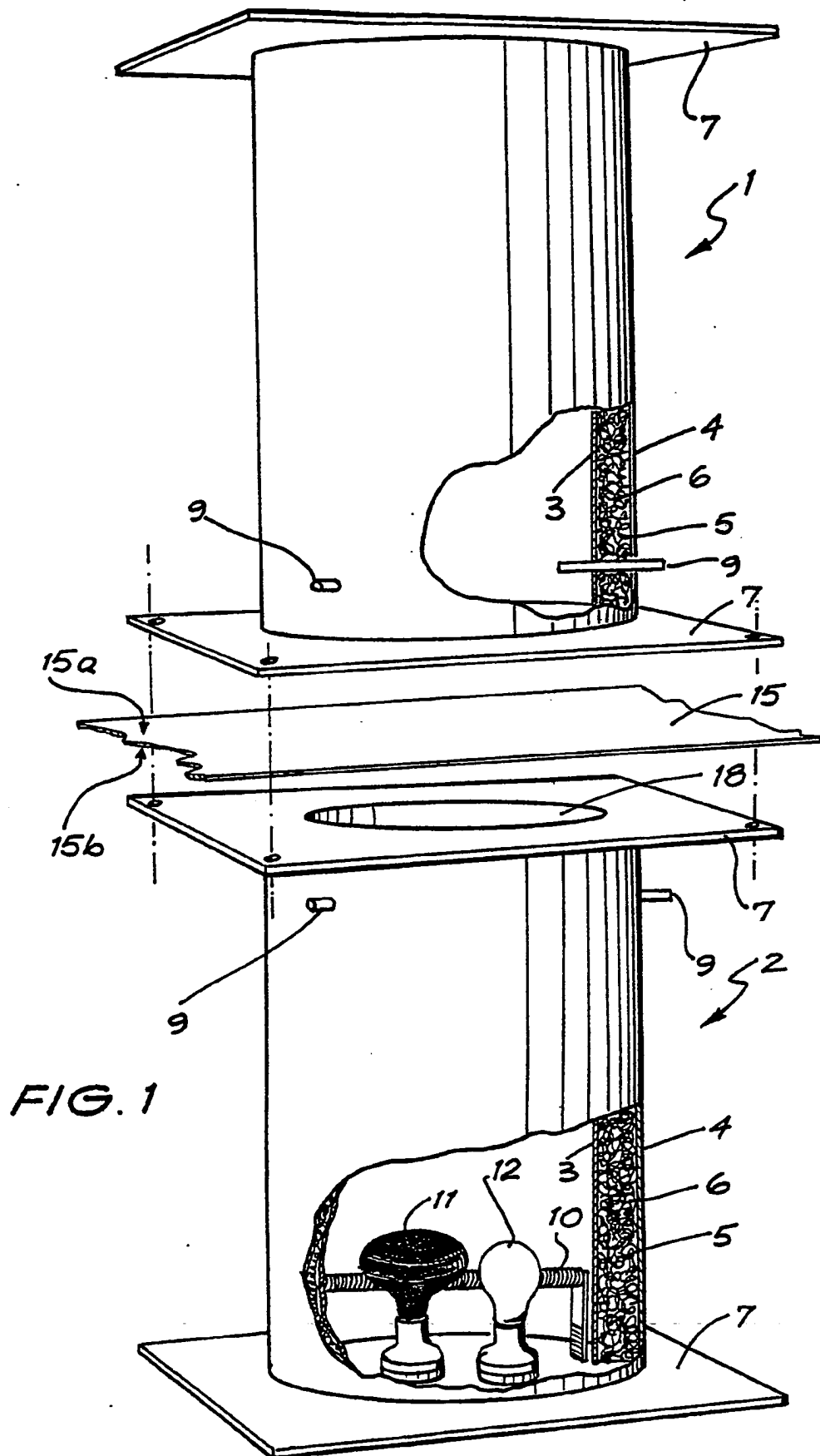
12. A method of producing an insulating coating, said method including the steps of:

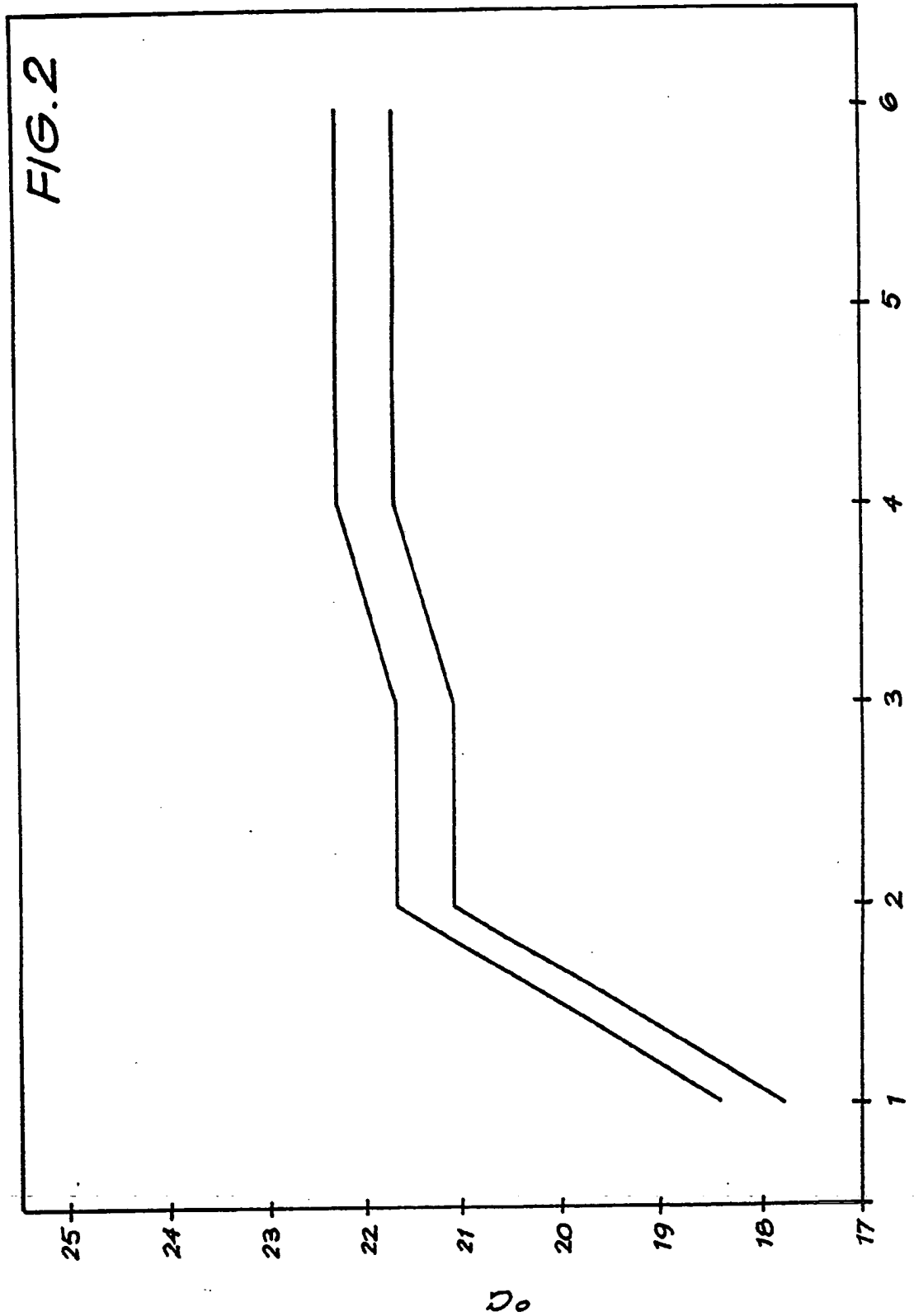
- (a) collecting bagasse;
- (b) grinding and/or particulating said bagasse to an average particle size of 0.01 mm to 5 mm; and
- (c) mixing the particulated bagasse into a paint, coating composition or like substance.

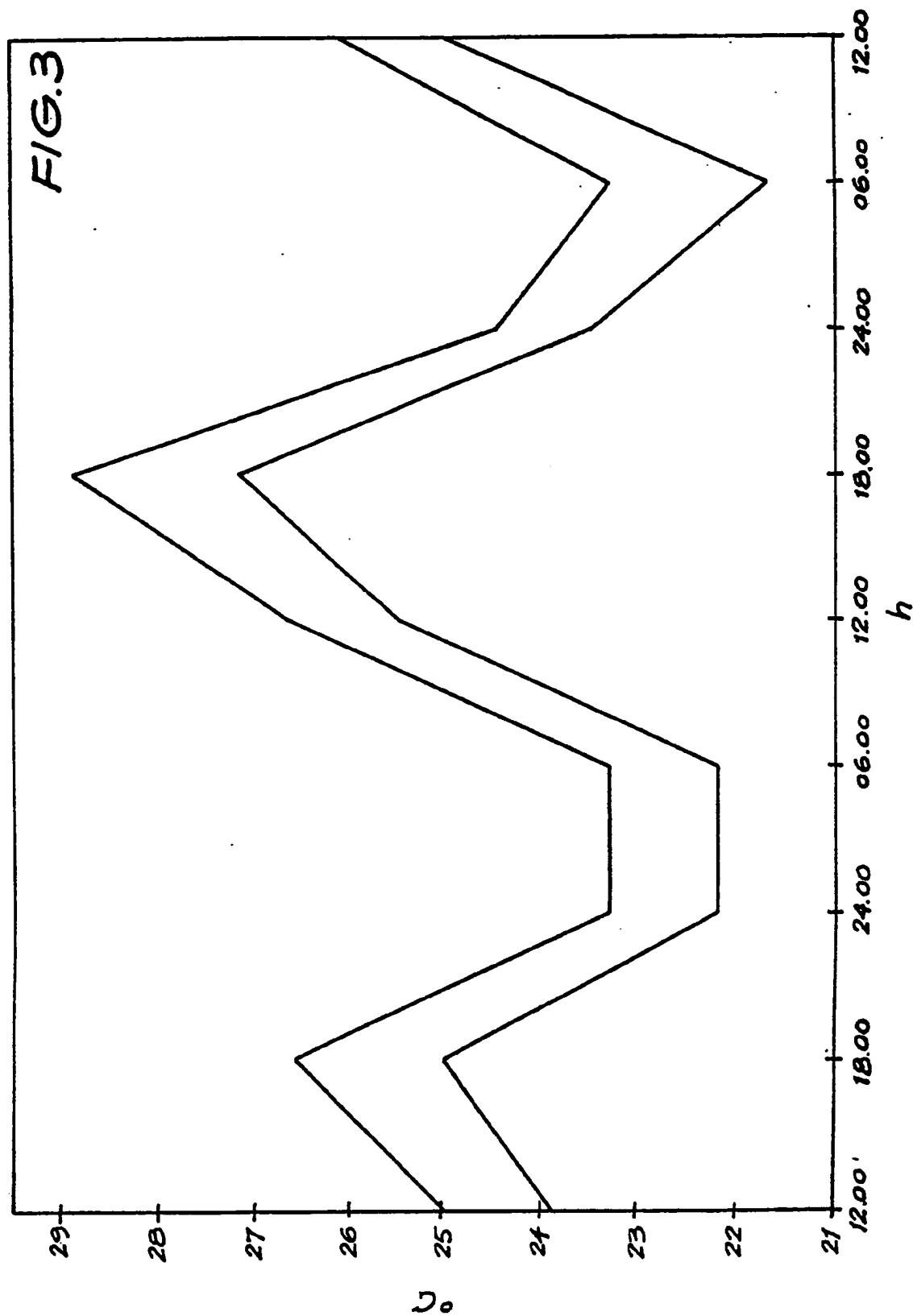
13. A method of producing an insulating coating as claimed in Claim 12, wherein said bagasse (the natural substance) is replaced by an, artificially produced equivalent.

14. An insulating coating being substantially as herein described with reference to the accompanying drawings and examples.

15. A method of producing an insulating coating, said method being substantially as herein described with reference to the accompanying drawings and examples.







INTERNATIONAL SEARCH REPORT

International Application No PCT/AU 86/00048

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) * According to International Patent Classification (IPC) or to both National Classification and IPC <div style="text-align: center; font-size: 1.2em;">Int. Cl.⁴ C09D 5/00, 7/12</div>						
II. FIELDS SEARCHED <div style="text-align: center; font-size: 0.8em;">Minimum Documentation Searched</div> <table style="width: 100%; border: none;"> <tr> <td style="width: 30%; border: none;">Classification System</td> <td style="border: none;">Classification Symbols</td> </tr> <tr> <td style="border: none; text-align: center;">IPC</td> <td style="border: none; text-align: center;">C09D 5/00, 7/12</td> </tr> </table>			Classification System	Classification Symbols	IPC	C09D 5/00, 7/12
Classification System	Classification Symbols					
IPC	C09D 5/00, 7/12					
<div style="text-align: center; font-size: 0.8em;">Documentation Searched other than Minimum Documentation to the extent that such Documents are included in the Fields Searched *</div>						
AU: IPC as above						
III. DOCUMENTS CONSIDERED TO BE RELEVANT *						
Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³				
X	AU, B, 33976/78 (520716) (TORAY INDUSTRIES INC) 13 September 1979 (13.09.79)	(1, 3, 9)				
X	DE, A, 2445075 (FUJI KURA CABLE WORKDS L.T.D.) 3 April 1975 (03.04.75)	(1, 3, 9, 10)				
X	FR, A, 1466597 (HEIJMER) 20 January 1967 (20.01.67)	(1)				
X	US, A, 4277355 (FARCNK) 7 July 1981 (07.07.81)	(1)				
X	JP, A, 59058-065 (TORAY INDUSTRIES INC) 3 April 1984 (03.04.84) (Derwent English Language Abstract 84-118595/19)	(1)				
A, P	AU, B, 37653/85 (PPG INDUSTRIES INC) 8 August 1985 (08.08.1985)					
A	US, A, 4351669 (NIELSEN) 28 September 1982 (28.09.82)					
A	US, A, 4240936 (HENNING) 23 December 1980 (23.12.80)					
<div style="font-size: 0.8em;"> * Special categories of cited documents: ¹⁰ "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family </div>						
IV. CERTIFICATION						
Date of the Actual Completion of the International Search <div style="font-size: 1.1em;">5 JUNE 1986 (05.06.86)</div>	Date of Mailing of this International Search Report <div style="font-size: 1.1em;">(13-06-86) 13 JUNE 1986</div>					
International Searching Authority <div style="font-size: 1.1em;">AUSTRALIAN PATENT OFFICE</div>	Signature of Authorized Officer <div style="font-size: 1.2em; text-align: right;"><i>Kim Tach.</i></div>					

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

X, A	JP, A, 6008-466 (DAINICHI SEIKA COLOR CHEM) 28 January 1981 (28.01.81) (Derwent English Language Abstract 20343 D/12)	(1)
A	JP, A, 5080-474 (SANYO KOKUSAKU PULP) 17 June 1980 (17.6.80) (Derwent English Language Abstract 54332C/31)	
A	JP, A, 8222-161 (FUJIKAWA NIPPON SEN) 23 December 1983 (28.12.83) (Derwent English Language Abstract 84-033172/06)	

V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE¹

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☐ Claim numbers because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claim numbers because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claim numbers because they are dependent claims and are not drafted in accordance with the second and third sentences of PCT Rule 6.4(a).

VI. ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING²

This international searching authority found multiple inventions in this international application as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.

2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

4. ☐ As all searchable claims could be searched without effort justifying an additional fee, the international searching authority did not invite payment of any additional fee.

Remark on Protest

☐ The additional search fees were accompanied by applicant's protest.

☐ No protest accompanied the payment of additional search fees.

2/11/05, EAST Version: 2.0.1.4

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON
INTERNATIONAL APPLICATION NO. PCT/AU 86/00048

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document
Cited in Search
Report

Patent Family Members

AU 33976/78	BR 7801476	CA 1118929	CH 628366
	DE 2810072	FR 2383220	GB 1596107
	JP 53111336	NL 7802636	SE 7802753
	US 4211823		

DE 2445075	JP 50058137	CH 12061/74	GB 1442249
	US 4017155	JP 50061433	JP 50051698
	JP 50061618		

US 4277355

AU 37653/85	BR 8500396	EP 153699	ES 539999
	JP 60181173		

US 4351669	SE 1149544	CH 645909	DE 3030611
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US 4240936	US 4324000
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END OF ANNEX